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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/789,819	02/27/2004	Osamu Shinkawa	9319S-000673	5637
27572	7590	05/12/2006	EXAMINER	
HARNESS, DICKEY & PIERCE, P.L.C. P.O. BOX 828 BLOOMFIELD HILLS, MI 48303			HSIEH, SHIH WEN	
			ART UNIT	PAPER NUMBER
			2861	

DATE MAILED: 05/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/789,819

Applicant(s)

SHINKAWA ET AL.

Examiner

Shih-wen Hsieh

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-74 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 23-49, 51-71, 73 and 74 is/are allowed.
- 6) ☒ Claim(s) 1-7, 9-17, 19-22, 50 and 72 is/are rejected.
- 7) ☒ Claim(s) 8 and 18 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2-27-05; 7-12-04; 7-2-04
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. "X" references and "Y" references listed in the European Search Report are considered.

Claim Objections

3. Claims 8, 23, 26, 73 and 74 are objected to because of the following informalities:

In regard to:

Claim 8:

Page 133, line 3, "said second threshold" is believed to be "said second period".

Please advise.

Claims 23, 26, 73 and 74:

Line 3, please change "said cavity" into "a cavity" to correct a minor lack of antecedent basis problem.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 5-7, 9-13, 16, 19, 21, 22, 50 and 72 are rejected under 35 U.S.C. 102(b) as being anticipated by Fukano (JP 63-141750, from IDS).

In regard to:

Claim 1:

Fukano teaches:

A droplet ejection apparatus having a head unit (fig. 3) including a plurality of droplet ejection heads each ejecting liquid within a cavity (23, fig. 3) through a nozzle (25, fig. 3) in the form of droplets by driving an actuator (9, fig. 3) by way of a driving circuit (buffers 1 and 2; the transistors 4-6; and resistance 12-15, fig. 1, page 4, lines 19-21), said apparatus comprising:

ejection failure detecting means (buffer 3; transistors 7 and 8; the diode 11; the capacitor 10 and the resistance 16-21, fig. 1) for detecting an ejection failure of said

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droplet ejection heads and a cause thereof, refer to page 8, last line to page 5, lines 13-16 and page 9, line 1; and

recovery means for performing recovery processing depending on the cause of the ejection failure if said ejection failure detecting means detects the ejection failure, refer to page 8, line 20 to page 9, line 5. Note: although recovery means is not explicitly mentioned in Fukano's reference, so long as head cleaning operation is automatically performed when e.g., bubbles are detected, it is certainly done by a recovery means such as suction pumps.

Claim 5:

Fukano further teaches:

wherein, each of said droplet ejection heads includes a diaphragm (26, fig. 3) that is displaced when the actuator is driven (see page 4, lines 1-2 and page 5, lines 17-22); and

said ejection failure detecting means detects a residual vibration of said diaphragm and determines an ejection failure of said droplets based on a vibration pattern of the detected residual vibration of said diaphragm, refer to English constitution, in which lines 3-5 denotes the residual vibration and page 6, line 17 to page 7, line 2 and fig. 5 for the vibration pattern when bubbles are detected.

Claim 6:

Fukano further teaches:

wherein:

said ejection failure detecting means includes judging means (transistor 8, resistances 19-21 and buffer 3, fig. 1) for judging at least one of a presence and an absence of an ejection failure of the droplets in the corresponding droplet ejection head based on the vibration pattern of the residual vibration of said diaphragm, and judging the cause of the ejection failure upon judging the presence of the ejection failure of the droplets in said droplet ejection head, refer to fig. 4 for judging there is no bubble; and fig. 5 for judging there is bubble and page 7, line 3 to page 8, line 6.

Claim 7:

Fukano further teaches:

wherein: the vibration pattern of the residual vibration of said diaphragm includes a cycle of the residual vibration, refer to fig. 5(d) and page 8, lines 4-6.

Claims 9 and 10:

Fukano further teaches:

wherein:

said ejection failure detecting means includes an oscillation circuit (9 and 14, fig. 1) and said oscillation circuit oscillates based on an electric capacitance component of said actuator that varies with the residual vibration of said diaphragm (claim 9), refer to page 5, line 17 to page 7, line 2; and

wherein:

said oscillation circuit forms a CR oscillation circuit from the electric capacitance component of said actuator and a resistance component of a resistor element

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connected to said actuator (claim 10). Note: 9 and 10 in fig. 1 is the RC oscillation circuit. The actuator (9) itself is a capacitance.

Claim 11:

Fukano further teaches:

wherein:

said ejection failure detecting means includes an F/V converting circuit (see page 7, line 13+) that generates a voltage waveform of the residual vibration (see fig. 4(d) and fig. 5(d)) of said diaphragm from a predetermined signal group (see fig. 2) generated based on a change of an oscillation frequency in an output signal from said oscillation circuit, refer to page 7, line 13 to page 8, line 6.

Claim 12:

Fukano further teaches:

wherein:

said ejection failure detecting means includes a waveform shaping circuit (10, 11 and 16, fig. 2) that shapes the voltage waveform of the residual vibration of said diaphragm generated in said F/V converting circuit into a predetermined waveform (such as the waveforms shown in fig. 4(c) or fig. 5 (c)), refer to page 7, lines 3-25.

Claim 13:

Fukano further teaches:

Wherein said waveform shaping circuit includes:

DC component removing means (10, fig. 1) for removing a direct current component from the voltage waveform of the residual vibration of said diaphragm generated in said F/V converting circuit, refer to page 7, line 3 to page 8, line 6; and

a comparator that compares the voltage waveform, from which the direct current component has been removed by said DC component removing means with a predetermined voltage value, refer to page 8, line 20 to page 9, line 5, note: the comparator is in a processor (see page 8, line 21-23),

said comparator generating and outputting a rectangular wave based on the voltage comparison, see fig. 4(d) or 5(d) for rectangular waves.

Claim 16:

Fukano further teaches:

switching means (T_4 , fig. 1) for switching a connection of said actuator from said driving circuit to said ejection failure detecting means after an ejection operation of the droplets is performed by driving said actuator, refer to page 5, line 21 to page 7, line 2. Note: T_4 is turned on by pulse voltage DPW, ink is ejected and ink was refilled, and after t_w is over, T_4 then turned off. Detection is then done by measuring frequency of the oscillating waveforms to decide whether bubbles occur.

Claim 19:

Fukano further teaches:

wherein:

said ejection failure detecting means detects an ejection failure of said droplets at a time of at least one of the droplet ejection operation during the flushing process and

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the droplet ejection operation during a print operation by said nozzle as a target of detection, refer to page 8, last line to page 9, line 18. Note: rejection to this claim is pointed to the droplet ejection operation during a print operation. If detection decides bubbles occurs during printing, cleaning is initiated.

Claim 21:

Fukano further teaches:

wherein:

said actuator comprises a piezoelectric actuator using a piezoelectric effect of a piezoelectric element, refer to page 4, lines 3-4.

Claim 22:

Fukano further teaches:

storage means for storing the cause of an ejection failure of said droplets detected by said ejection failure detecting means, in connection with said nozzle as the target of detection, refer to page 8, line 20 to page 9, line 5. Note: microprocessor is the storage means, when normal T_2 is compared (see page 8, lines 22-23), whether bubble occur or not are decided. This comparison process is a cause storage process.

Claim 50:

An ejection failure recovery method for a droplet ejection apparatus having a head unit including a plurality of droplet ejection heads each ejecting liquid within a cavity through a nozzle in the form of droplets by driving an actuator with a driving circuit, said method comprising:

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detecting an ejection failure of said droplet ejection heads and a cause thereof;
and

performing recovery processing depending on the cause of the ejection failure in
a case where the ejection failure is detected.

Rejection:

This method claim corresponds to apparatus claim, claim 1, and the steps in this
claim are deemed to be made inherent by the functions of the structure in the
combination discussed above.

Claim 72:

A droplet ejection apparatus having a head unit including a plurality of droplet
ejection heads each ejecting liquid within a cavity through a nozzle in the form of droplets
by driving an actuator by way of a driving circuit, said apparatus comprising:

an ejection failure detector which detects an ejection failure of said droplet
ejection heads and a cause thereof; and

a recovery device which performs recovery processing depending on the cause
of the ejection failure if said ejection failure detector detects the ejection failure.

Rejection:

This claim is rejected on the basis as set forth for claim 1 discussed above.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukano in view of Scardovi (US Pat. No. 4,695,852).

In regard to:

Claim 2:

Fukano teaches automatically performing ink jet head cleaning when nozzle malfunctioning is detected without further teaching what are the means to be used to perform such cleaning operation.

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Scardovi teaches a nozzle malfunction detection unit (21, fig. 1), which in conjunction with a pressure detection unit (18, fig. 1) to detect malfunctioning of a print head (5, see col. 2, lines 58-66). Scardovi further teaches a purge station generally formed by a cap for covering nozzles (7, fig. 1) when the head remains inactive for a certain period of time for the purpose of reducing evaporation of ink (9, fig. 1) and associated incrustation in the nozzle or nozzles (see col. 2, lines 44-57). The purge station may comprise a suction pump, this suction pump corresponds to the suction means in the instant application.

Therefore it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the device of Fukano to include this suction pump as taught by Scardovi for the purpose of sucking ink out of the nozzles to act as a recovery means so as to bring back normal functioning of the nozzles.

As to the flushing means, since "flushing" is merely an ink discharge operation. This is done generally by applying a signal to the print head, and this signal is different from that used in normal printing (or can be the same). The discharged ink are useless or may be recycled for reuse. Therefore, so long as nozzle are there, flushing is performed by discharging ink through nozzles so as to clear, e.g., nozzle clogging. Therefore, the actuator and the nozzles form the flushing means.

As to the wiping means, since Scardovi teaches incrustation formed in the nozzle, this phenomenon also happens in Fukano's invention (although he did not mention). Because every ink jet printer operation under an environment where debris and ink mist are around nozzle area. These debris and ink mist are likely adhere to the

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nozzle area forming contamination. If it is not removed, its existing will influence the trajectory of ink jet droplet. Therefore, periodically nozzle face are cleaned by a flexible blade, and this blade is well known as a wiper or wiping means, and is ell known in the art, refer to MPEP 2144.03, In re Malcolm, 129 F.2d 529, 54 USPQ 235 (CCPA 1942).

Therefore it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the device of Fukano as modified in view of Scardovi to include a wiper as most prior art do as a piece of recovery means for the purpose of removing contaminates from nozzle face.

Claim 3:

Fukano further teaches:

wherein: the cause of an ejection failure detectable by said ejection failure detecting means includes:

intrusion of an air bubble inside said cavity, refer to page 8 last line to page 9, line 5.

Scardovi in the device of Fukano as modified in view of Scardovi teaches:

thickening of the liquid in a vicinity of said nozzle (note: incrustation is a result of thickening of the liquid in a vicinity of said nozzle due to evaporation of solvent contained in the ink); and

adhesion of dust in a vicinity of an outlet of said nozzle, note: adhesion of dust is also a part of reasons for forming incrustation around a vicinity of an outlet of the nozzles; and

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said recovery means performs the pump-suction process by said pumping means in a case of the intrusion of an air bubble, at least one of the flushing process by said flushing means and the pump-suction process by said pumping means in a case of the thickening of the liquid (as discussed above for claim 2 in nozzle recovery operation, either purging or flushing is done, and to make the recovery operation more efficient, then both purging and flushing are done, this is so-called a push-and-pull operation).

The device of Fukano as modified in view of Scardovi **does not** provide wiping. However, as discussed above, a wiping device is generally provided as a part of the recovery system other than suction pump and capping device. Therefore in order to remove contamination or incrustation in the vicinity of the nozzle, a wiping device is required.

Claim 4:

The droplet ejection apparatus according to claim 3, wherein:

when said ejection failure detecting means detects the intrusion of an air bubble and the thickening of the liquid that need said pump-suction process in more than one droplet ejection head of said head unit, said recovery means performs the pump-suction process for the droplet ejection heads where the intrusion of an air bubble and the thickening of the liquid are detected.

Rejection:

Fukano teaches said ejection failure detecting means detects the intrusion of an air bubble (as discussed above).

Scardovi in the device of Fukano as modified in view of Scardovi teaches ink evaporation that leads to ink thickening and a pumping action is to be taken when this phenomenon occurs. The pump action can be performed to all of the droplet ejection heads or can be selectively done to those heads, which indication malfunctioning. These two case are well known in the art, and the latter consumes less ink than the former, refer to MPEP 2144.03, In re Malcolm, 129 F.2d 529, 54 USPQ 235 (CCPA 1942).

8. Claims 14, 15, 17 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukano.

In regard to:

Claims 14 and 15:

Fukano does not explicitly teach:

wherein: said ejection failure detecting means includes measuring means for measuring a cycle of the residual vibration of said diaphragm from said rectangular Wave generated in said waveform shaping circuit (claim 14); and

wherein: said measuring means has a counter, and measures at least one of a time between rising edges and a time between a rising edge and a falling edge of said rectangular wave by counting pulses of a reference signal with said counter (claim 15).

Fukano teaches in his page 6, line 20 to page 7, line 2:

If bubbles occurs in the ink chamber (23, fig. 3 or ink cavity), the change in the piezo-electric element impedance creates an oscillating waveform that takes longer

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than the normal period and this is detected. The statement of Fukano in the quoted page and lines means there is a measuring means usually in the form of a counter does existed in Fukano's invention so as to measure T_2 such as the one shown in fig. 5(d), and using this T_2 to compare with a normal T_2 so as to decide whether bubbles occurs.

Claim 17:

The device of Fukano DIFFERS from claim 17 in that it does not teach:

wherein: said droplet ejection apparatus comprises more than one ejection failure detecting means and more than one switching means; and the switching means corresponding to said droplet ejection head that has performed the droplet ejection operation switches the connection of said actuator from said driving circuit to a corresponding ejection failure detecting means, and said switched ejection failure detecting means detects an ejection failure of said droplets.

Fukano's invention is just show one nozzle head and its associated circuitry.

Therefore it would have been an obvious matter to have more than one print head such as black, cyan, magenta and yellow heads, and each head has its own drive and detection circuitries, since it has been held that mere duplication of the essential working parts of a device, and in this case, the circuitry shown in Fukano's fig. 1 involves only routine skill in the art, refer to MPEP 2144.04 VI B.

Claim 20:

The droplet ejection apparatus according to claim 1, wherein: said actuator comprises an electrostatic actuator.

Rejection:

Electrostatic actuator is one type of actuator among such as electro-thermal converter, piezo electric or laser.

Allowable Subject Matter

9. Claims 23-49, 51-71, 73 and 74 are allowed.

10. Claims 8 and 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. The following is a statement of reasons for the indication of allowable subject matter:

In regard to:

Claim 8:

The primary reason for the allowance of claim 8 is the inclusion of the limitations of the liquid has thickened in the vicinity of said nozzle when the cycle of the residual vibration of said diaphragm is longer than a predetermined second period; and dust is adhering in the vicinity of the outlet of said nozzle when the cycle of residual vibration of said diaphragm is longer than said first period and shorter than said second period. It is these limitations found in this claim, as it is claimed in the combination that has not been

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found, taught or suggested by the prior art of record, which makes this claim allowable over the prior art.

Claim 18:

The primary reason for the allowance of claim 18 is the inclusion of the limitation of said ejection failure detecting means further includes detection determining means for determining for which nozzle among said nozzles detection of an ejection failure of said droplets is to be performed. It is these limitations found in this claim, as it is claimed in the combination that has not been found, taught or suggested by the prior art of record, which makes this claim allowable over the prior art.

Claims 23-25, 29-49, 54 and 67-71:

The primary reason for the allowance of claims 23-25, 29-49, 54 and 67-71 is the inclusion of the limitation of wherein if detection by said ejection failure detecting means is performed for all of said nozzles and the presence of a failing nozzle in which an ejection failure is occurring is detected, recovery processing depending on the cause of the ejection failure is performed by said recovery means at least for said failing nozzle, after which detection by said ejection failure detecting means is performed again by forcing said failing nozzle alone to perform a droplet ejection operation. It is this limitation found in each of the claims, as they are claimed in the combination that has not been found, taught or suggested by the prior art of record, which makes these claims allowable over the prior art.

Claims 26-28, 51-53 and 55-66:

The primary reason for the allowance of claims 26-28, 51-53 and 55-66 is the inclusion of the limitations of if the presence of a failing nozzle in which an ejection failure is occurring is detected when detection by said ejection failure detecting means is performed for all of said nozzles, the flushing process is performed for said failing nozzle alone, after which detection by said ejection failure detecting means is performed again by forcing said failing nozzle alone to perform a droplet ejection operation, and when the presence of a re-failing nozzle in which the ejection failure has not been eliminated is detected, recovery processing depending on the cause of the ejection failure of said re-failing nozzle is performed by said recovery means at least for said re-failing nozzle, after which detection by said ejection failure detecting means is performed once again by forcing said re-failing nozzle alone to perform the droplet ejection operation. It is these limitations found in each of the claims, as they are claimed in the combination that has not been found, taught or suggested by the prior art of record, which makes these claims allowable over the prior art.

Claim 73:

The primary reason for the allowance of claim 73 is the inclusion of the limitation of wherein if detection by said ejection failure detector is performed for all of said nozzles and the presence of a failing nozzle in which an ejection failure is occurred is detected, recovery process depending on the cause of the ejection failure is performed by said recovery device at least for said failing nozzle, after which detection by said ejection failure detector is performed again by forcing said failing nozzle alone to perform a droplet ejection operation. It is these limitations found in this claim, as it is

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claimed in the combination that has not been found, taught or suggested by the prior art of record, which makes this claim allowable over the prior art.

Claim 74:

The primary reason for the allowance of claim 74 is the inclusion of the limitation of if the presence of a failing nozzle in which an ejection failure is occurring is detected when detection by said ejection failure detector is performed for all of the nozzles, the flushing process is performed for said failing nozzle alone, after which detection by said ejection failure detector is performed again by forcing said failing nozzle alone to perform a droplet ejection operation, and when the presence of a re-failing nozzle in which the ejection failure has not been eliminated is detected, recovery processing depending on the cause of the ejection failure of said re-failing nozzle is performed by said recovery device at least for said re-failing nozzle, after which detection by said ejection failure detector is performed once again by forcing said re-failing nozzle alone to perform the droplet ejection operation. It is these limitations found in this claim, as it is claimed in the combination that has not been found, taught or suggested by the prior art of record, which makes this claim allowable over the prior art.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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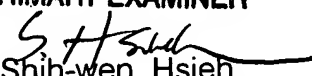
US 6,565,185B1, "Nozzle testing before and after nozzle cleaning" issued to Endo, 5/2003 teaches nozzles testing before and after nozzle cleaning. In this reference, Endo's testing corresponds to detecting whether nozzle or more than one nozzles has/have malfunction. After cleaning malfunctioning nozzle/nozzles, testing of nozzle malfunctioning is conducted again. If there is/are nozzle(s) has/have malfunctioning, a printing will just use healthy nozzles left to perform the printing job.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shih-wen Hsieh whose telephone number is 571-272-2256. The examiner can normally be reached on 7:30AM -5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, S D. Meier can be reached on 571-272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SHIH-WEN HSIEH
PRIMARY EXAMINER


Shih-wen Hsieh
Primary Examiner
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